

SR4 East Corridor Transit Study

SUMMARY REPORT

December 12, 2002

BART

CCTA



ENGINEERS
PLANNERS
ECONOMISTS

Wilbur Smith Associates

in association with
URS Corporation
MOORE IACOFANO GOLTSMAN
Economic & Planning Systems
Nancy Whelan Consulting

Acknowledgements

We would like to recognize the efforts of the following individuals whose participation contributed significantly to the success of this project.

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For those who desire more detailed information about any aspect of the study, there are two companion documents:

- Technical Studies – Volume I – Technical Reports and White Papers
- Technical Studies – Volume II – Detailed Cost Data

Technical Studies – Volume I – Technical Reports and White Papers**Technical Reports**

- *Project Goals & Evaluation Criteria*
- *Community Outreach Program Reports*
- *Transit Improvement Options*
- *Motorist License Plate Survey Results*
- *BART Rider Survey Results*
- *Demographic and Land Use Analysis*
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White Papers

- *Implementation Issues Related to Package C-1 versus C*
- *Railroad Gauge*
- *Station Parking Requirements*
- *Transit Oriented Development Related Ridership*
- *Right-of-Way Costs*
- *UPRR Acquisition Issues*
- *Vehicles*
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Chapter I: Introduction and Background

PROJECT HISTORY

The planning and development of improvements within the State Route 4 East Corridor has been ongoing for over fourteen years. The culmination of these efforts has led to the widening of State Route 4 from Willow Pass Road in Concord to Railroad Avenue in Pittsburg. In addition, design is now underway to extend the widening of State Route 4 eastward from Railroad Avenue to Loveridge Road. Environmental studies are underway to extend the widening through the Loveridge Road interchange. These improvements have been funded by the CCTA with Measure C funds and represent the eastern limit of the projects which are currently programmed to be funded by the CCTA.

In 1996 the BART extension to Pittsburg/Bay Point opened. From the opening day the extension has been heavily utilized. The station's 2,000 parking spaces regularly fill by 7:00 a.m. on weekdays, and a high percentage of BART passengers use Tri Delta Transit buses, carpools, are dropped off, walk or bike to the station. The station currently serves over 10,000 persons entering and exiting the BART system each weekday.

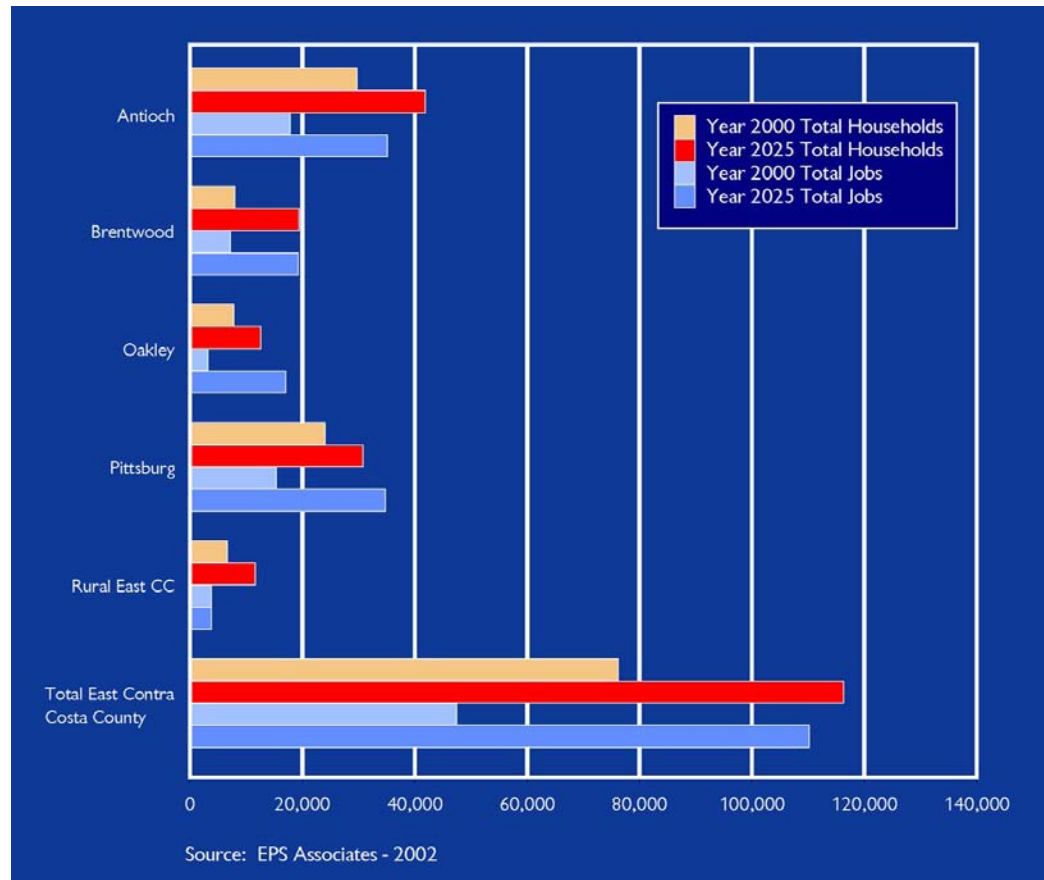
It is clear that highway improvements alone can not keep pace with the anticipated growth in the State Route 4 East Corridor. To address the growing need for improved transportation facilities in the East County, local policy makers determined that a strategy of combined improvements including transit options must be employed. The Contra Costa Transportation Authority (CCTA) and the Bay Area Rapid Transit District (BART) formed a partnership and selected a team of consultants lead by Wilbur Smith Associates to conduct the State Route 4 East Corridor Transit Study.



SR4 at Railroad Avenue



Pittsburg/Bay Point BART Station



East County Housing and Employment Forecasts - Year 2000 and 2025

PURPOSE AND NEED

The purpose of this study is to define, develop, and reach a consensus on short-term, mid-term and long-term transit development strategies for the State Route 4 East Corridor. The East County study area is the fastest growing portion of the San Francisco Bay Region. Between the years 2000 and 2025 an additional 40,000 households and 63,000 jobs are expected to be added in the East County. This will represent a 53 percent increase in households and a 132 percent increase in jobs. Traffic delay and congestion on Highway 4 and on the few alternative street and highway routes available to commuters are expected to increase dramatically. The completion of the widening of State Route 4 to Hillcrest Avenue requires another \$250 million and a minimum of eight additional years. The State Route 4 Bypass is not expected to be completed until between 2005 and 2010. With the completion of these projects the major transportation investments currently planned in the East County will be complete.

In terms of transit, the only significant projects which are currently planned are the addition of 500 parking spaces to the Pittsburg/Bay Point BART station and the implementation of express bus improvements. These bus improvements involve added express service on State Route 4 to Pittsburg/Bay Point BART and to the Tri-Valley area.

With the magnitude of the expected growth of the East County, the knowledge that highway congestion will only increase, and the high level of usage of the Pittsburg/Bay Point BART station, it is clear that there is a need for a significant investment in transit improvements in the State Route 4 East Corridor.

While an extension of BART to a new station near Hillcrest Avenue in Antioch has been discussed for many years, it has also been clear that there will not be sufficient funding available to fund such a major investment for many years. The fundamental purpose of the State Route 4 East Corridor Transit Study is to determine what transit improvements would be a timely and effective measure to provide East County residents and employees with alternatives to auto travel in the near and medium term.

GOALS AND OBJECTIVES

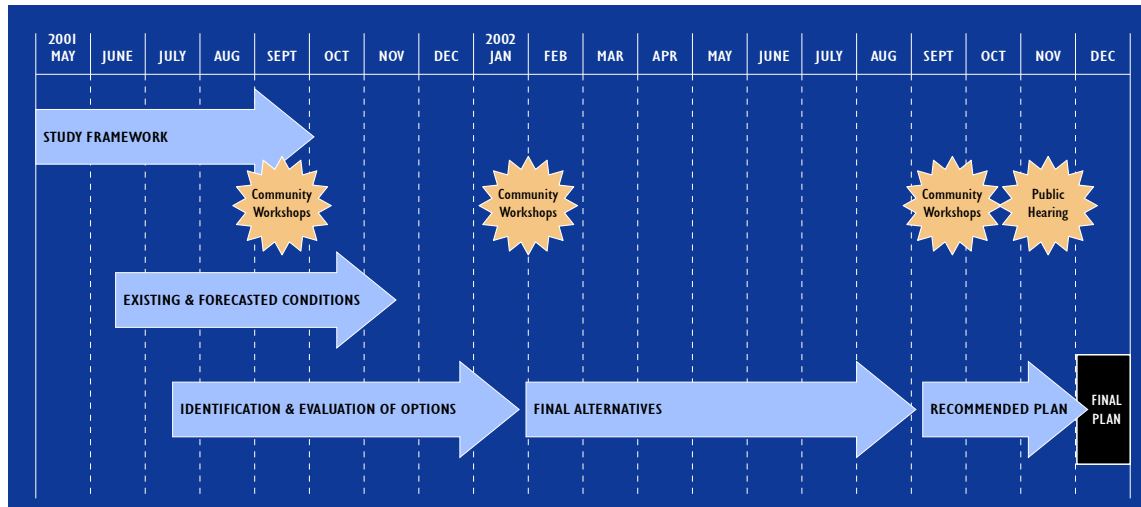
During the course of the study the Policy Advisory Committee (PAC), with direct input from the public as received at the community workshops on the project, adopted the following project goals and objectives:

- Improve transportation service
- Maximize access to transit system
- Maximize connectivity and seamlessness of transit system, both from home to transit and from one form of transit to another
- Promote transit-oriented land use initiatives and policies
- Maximize economic benefits and financial feasibility
- Balance short, medium, and long-term strategies
- Protect or enhance the environment

These goals were used as the basis for the development of criteria used to evaluate the alternative transit improvements that were identified and refined during the study. Throughout the study, the PAC emphasized that for any transit option that was to be considered, it should be upgradeable to BART with a minimum loss of initial investment. Each of the improvement packages was evaluated in terms of its ability to achieve the project goals.



Field Tour



Study Process and Timeline

STUDY PROCESS

The State Route 4 East Corridor Transit Study was designed to provide a high level of participation and input from East County residents, from the staff and policy representatives of each of the cities and the county, from the transit providers, the transit users, the highway users, and the special interest groups. The CCTA and BART formed an internal Project Development Team (PDT) to lead the study. The PDT met at least biweekly to assure that the study was on course and that all technical issues

were being addressed properly. The PDT reported at least once a month to the Technical Advisory Committee (TAC) and the Policy Advisory Committee (PAC). The TAC consisted of representatives from staffs of each jurisdiction and from the transportation providers in the East County. Their role was to review the technical aspects of the ongoing study effort and provide guidance and assistance as needed.

The PAC served as the decision making body for the study. This group consisted of policy makers: city council persons, planning commissioners, board members and commissioners from each of the jurisdictions and from the transportation providers. The PAC was actively involved in the study process and was asked to make key decisions along the way. One important step in the process involved a field tour where members of the PAC and the TAC were taken on a tour of the East County study area in a bus provided by Tri Delta Transit. The purpose of the tour was to inform the PAC of the physical characteristics of the alternatives to assist them in deciding which alternative should be studied further. Several members of the PAC also made a trip to Ottawa, Canada to observe the new suburban rail transit service that was recently implemented there.

Important aspects of the study process were the public involvement program and the steps used in defining and screening the alternative transit improvements. During

the course of the study several meetings were held with representatives of the Union Pacific Railroad to discuss the possible use of the railroad's Mococo Line right-of-way through East County for the provision of transit services.

Public Involvement Process

A major effort was devoted to provide the public with opportunities to participate in the process. The process included:

- A project website at www.ccta.net and www.bart.gov which provided up-to-date information about the project, copies of reports and presentations, and an e-mail address for interested parties to send in comments or questions.
- A project 1-800 telephone hotline for the public to state their opinion or ask questions for the project.
- Three rounds of community workshops or meetings were held. Each round consisted of a meeting in Bay Point/Pittsburg, Antioch, and Brentwood. The initial round of workshops was designed to inform the public of the scope of the project and solicit input as to the options to be considered. The second set of workshops provided the public with an opportunity to overview the alternatives that were being considered. The final set of workshops was designed to allow attendees to select their preferred alternative. Meeting notices for each of workshops were sent to every household in the East County study area. The workshops were also advertised in the news media. All meeting materials were available in Spanish and English, and a Spanish interpreter attended each meeting.
- A survey was conducted of BART riders at the Pittsburg/Bay Point and North Concord BART stations. A second survey was conducted of motorists driving on State Route 4 at Railroad Avenue and on Kirker Pass Road, the Byron Highway, and Vasco Road.
- A series of stakeholder meetings was held with representatives of special interest groups to inform them about the project.
- A Public Hearing was held to allow the public the opportunity to comment on the selected alternative and on this report.



Community Workshop

Screening Process

An iterative process of alternatives definition, screening, and refinement was used during the study to gradually narrow and refine the list of improvement options. The project started with a long list of all the potential types of transit and transportation improvements which should be considered. The list of nearly twenty basic types of transit improvements was reviewed with the public at the first round of public meetings. Then working with the PAC, the list was refined into a series of eighteen mode specific alternatives. These alternatives were put through an initial screening process which identified major flaws in several of the alternatives. The field tour was used as a means of informing the PAC about these issues and assisted them in deciding which alternatives should be discarded and which should be studied further. This information was then presented to the public in the second round of community workshops. A detailed engineering and cost evaluation of the eight remaining alternatives was then performed. Ridership estimates were developed using a specially prepared set of land use assumptions for the year 2025, which reflected the General Plans of each of the cities and the county. Operating plans were also developed for each alternative allowing estimates of operating costs and revenues to be prepared. This information was then presented to the PAC and to the public in the third round of public workshops. Based on this information the PAC selected a preferred alternative which is described in this report.

Upgradeability

A key objective of the study, as emphasized by the PAC, was that any selected transit improvement option be upgradeable to. For this reason the transit options investigated in the study were planned such that the major fixed investments in structures and guideway would be built to the design standards required by BART. In addition the alignments for the transit improvements were to be compatible with a BART extension. This would allow the project to be upgraded to BART technology without the added expense of retrofitting the structures or modifying the route. Options which failed to meet these criteria were given a low ranking in the screening process.

Chapter 2: Description of the Project

The process used for the State Route 4 East Corridor Transit Study was designed to allow for the selection of a preferred alternative after all the possible options had been reviewed and evaluated. The project defined in this chapter is the alternative that the PAC unanimously selected as the preferred alternative. It is based on an innovative transit service concept which has come to be known as “eBART.”

THE eBART CONCEPT

The concept of eBART was the result of a search for a rail transit technology that could serve as a virtual extension of BART but be constructed at a much lower cost than a typical BART extension. A key requirement was that eBART not preclude future construction of BART. The CCTA and BART jointly sponsored the “eBART Feasibility Study.” This study, completed in 2001, concluded that a rail service using right-of-way acquired from the Union Pacific Railroad (UPRR) could be developed at a cost much lower than that which had been associated with an extension of BART. The service was proposed to operate on new exclusive double tracks alongside a relocated Union Pacific Mococo Line freight track. The trains would utilize light-weight, self-propelled rail cars known as Diesel Multiple Units (DMU).

The information from this earlier study was used as a starting point in the State Route 4 East Corridor Transit Study to help define the eBART alternative. The eBART concept was further defined as follows:

Service Philosophy

eBART was planned to provide the following service characteristics:

- Frequency/Headways – eBART would match BART headways and service hours. Currently BART operates out of Pittsburg/Bay Point every 15 minutes throughout most of the day, and by the year 2025 a twelve minute headway is planned.
- BART/eBART Transfer – The transfer between BART and eBART would be seamless, ideally with a short walk across the platform.



Bombardier Talent Articulated DMU



Colorado Railcar - FRA Compliant DMU



Regio Sprinter



Example of an eBART Type Station

- Stations – eBART stations would be simple at-grade platforms with sheltered areas for passengers. Parking would be provided at each station, as would a significant level of feeder bus services and bicycle/pedestrian access facilities.
- Fare Collection – The method of fare collection to be used on eBART would allow eBART users to make the transfer to BART without purchasing a second ticket.
- Operation – Ideally eBART would have its own exclusive double tracks to allow reliable operations without interference with other freight railroad or passenger train operations on the Union Pacific tracks. However, eBART trains could operate on the existing tracks if they were upgraded.

Technology Options

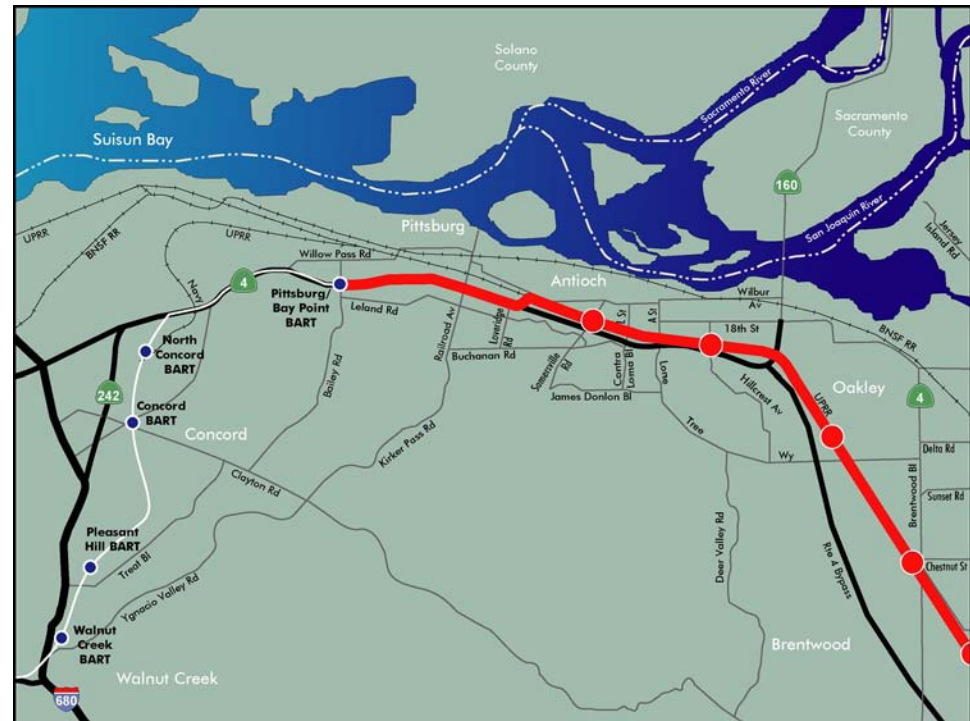
DMUs would be used to provide eBART service. This is not a new technology. Various forms of DMUs have operated in the United States since the early 1900's. The DMU technology is very popular in Europe. It is commonly used in suburban areas as a low cost means of introducing rail service, with the intent to upgrade the service as demand grows. One key technology issue regarding the operation of DMUs in the United States is that in order to operate on the same tracks with conventional railroad equipment, DMUs must comply with the Federal Rail Administration's (FRA) standards for crash worthiness. These standards are significantly different than those used in Europe, and as a result the equipment available from European manufacturers is not FRA compliant. In order to operate non-compliant equipment the DMUs must either be operated on tracks exclusively devoted to their use, or there must be a fixed time schedule during which only DMUs and no other rail traffic would use the rail lines.

During the study, BART staff developed a concept called bobBART, which would employ regular BART cars instead of DMUs. A special diesel locomotive unit would be developed in the frame of a BART car to power the train. The appeal of this concept is that the bobBART cars could couple to a regular BART train at the transfer station, and passengers would not have to leave the cars to make the transfer. It was concluded that bobBART is worthy of further study, but that there would need to be considerable further research into the technological and

operational issues before a decision is made. Also, use of bobBART technology requires that the new tracks be constructed to the width or gauge used by BART, which is wider than the standard gauge used for conventional railroad tracks. As a result bobBART trains would not be able to operate on standard gauge railroad tracks.

PACKAGE C - eBART - 2

The project would involve the construction of a new double track eBART system from the Pittsburg/Bay Point BART Station to Byron. The tracks would be constructed in the median of State Route 4 from the Pittsburg/Bay Point BART Station to Loveridge Road using the area reserved for a BART extension. At Loveridge Road the tracks would transition out of the freeway on an aerial structure over the interchange and would utilize the right-of-way of an existing spur track to reach the Union Pacific Mococo Line right-of-way. The railroad right-of-way would be reconfigured to accommodate eBART. The existing Union Pacific freight tracks would be relocated to one side of the right-of-way. This would provide space for the new double track eBART system to be constructed. The rights to use the right-of-way would be acquired from the Union Pacific. From this point east eBART would use the Mococo Line corridor all the way to Byron. The UPRR right-of-way is 100 feet wide for the most part and would provide adequate space for this purpose.



Package C. eBART-2: eBART via SR4 and UPRR

Five stations would be provided, with stations in the vicinity of where the railroad intersects:

- Somersville Road – Pittsburg/Antioch
- Hillcrest Avenue - Antioch

- Empire Avenue – Antioch/Oakley/Brentwood
- Central Avenue – Brentwood
- Downtown Byron

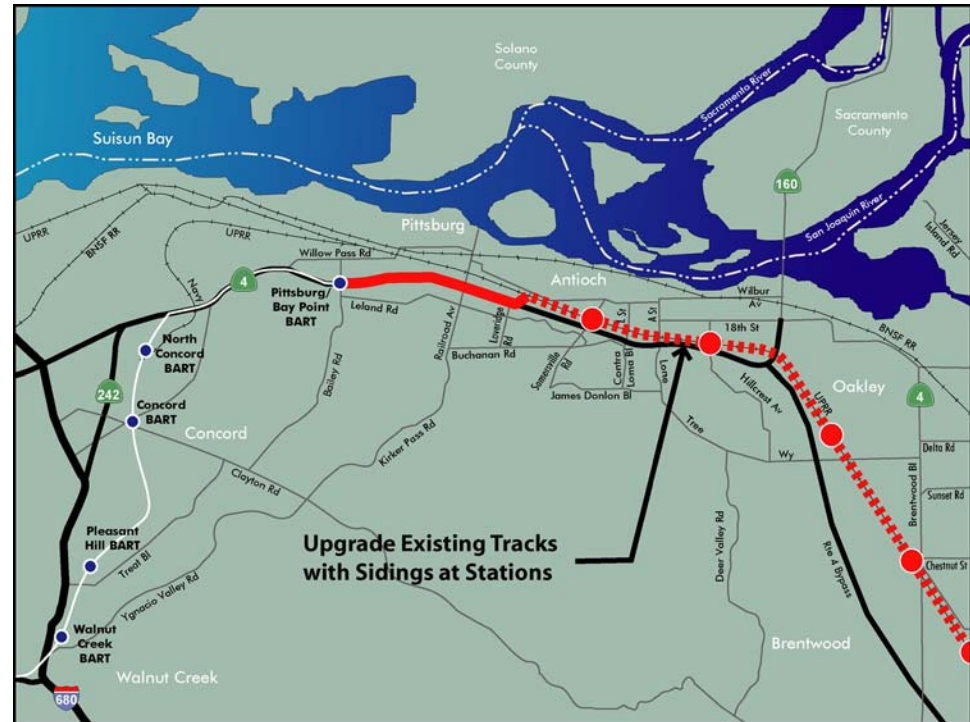
A train storage yard and maintenance facility is planned east of Hillcrest Avenue. Additional right-of-way will need to be obtained from other parties for the stations and the yard facility.

PROJECT PHASING

An important consideration with the eBART project is the ability to implement the project in logical phases that would allow service to be initiated as funding becomes available. For Package C, a number of phasing options exist. Packages C-1 and C-2 represent one phasing approach that would allow implementation of the full eBART system as defined in Package C in two major steps.

Package C-1

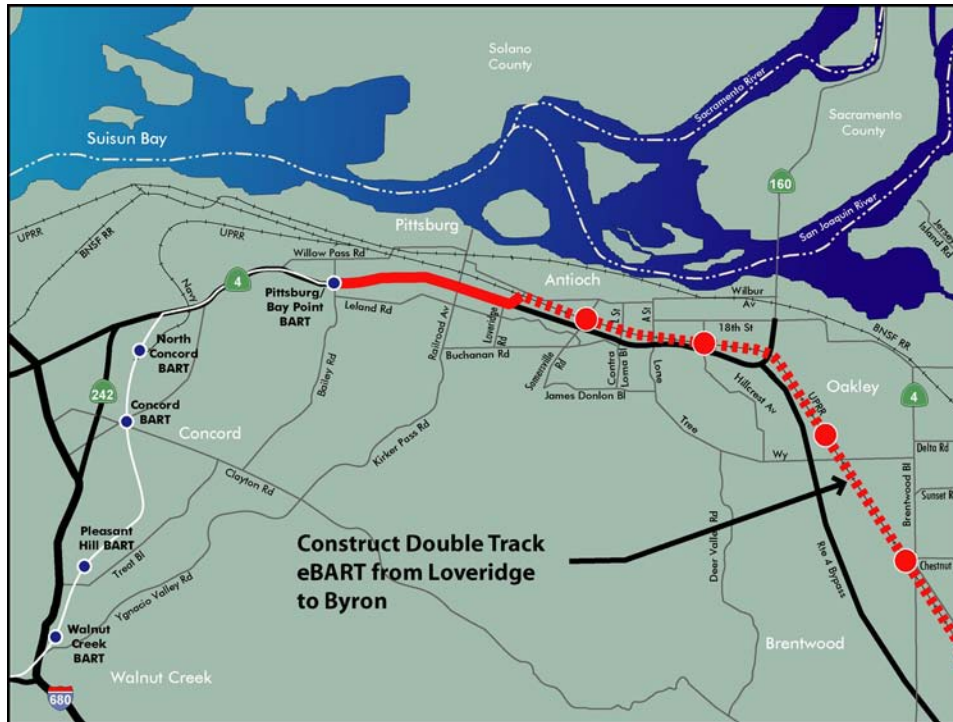
Package C-1 would be the first major phase of construction. After acquisition of the right-of-way and completion of environmental and design studies, the full double track eBART system would be constructed from the Pittsburg/Bay Point BART Station to the Loveridge Road interchange. After clearing the interchange the double track alignment would connect with the existing Union Pacific tracks. From this point all the way to Byron the existing single mainline UPRR tracks would be upgraded to accommodate



Package C-1. eBART-2: eBART to Byron Using Existing Tracks

an interim eBART. Passing sidings would be provided at three locations to allow trains traveling in opposite directions to pass each other. The sidings would be long enough to allow trains to pass each other without stopping. The system would be designed to allow trains to operate at speeds up to 59 miles per hour and would support headways of 15 minutes between trains.

Between Loveridge Road and the Hillcrest Station the existing Union Pacific tracks would be relocated to their ultimate alignment as planned in Package C. This is so that the existing at-grade crossings of Somersville



Package C-2. eBART-2: Upgrade eBART to Byron to Double Tracks

Road, A Street, and Hillcrest Avenue could be grade separated. The existing D Street at-grade crossing would potentially be closed to traffic. By realigning the UPRR tracks initially, these grade separations can be constructed in their ultimate locations, avoiding the need to eventually remove and rebuild the structures when the ultimate eBART configuration is constructed in Package C-2. This approach, even though it requires replacement of the existing grade separations in this segment, avoids any unrecoverable “sunk” costs for grade separations in Package C-1. All new structures would be constructed to a standard that would accommodate a future BART extension. All five stations planned for the ultimate eBART system would be constructed during this phase.

Package C-2

This second phasing package would entail the completion of the full eBART system to Byron. This involves the realignment of the UPRR tracks to one side of the right-of-way to make room for the construction of the double track eBART system from Loveridge Road to Byron. This would occur in a phased fashion that would allow eBART service to continue during construction.

OTHER ELEMENTS OF THE PROJECT

The eBART project includes the following elements which would both complement the project and ensure an improved level of transit access for all of the East County.

Grade Separations

As noted earlier the project includes new grade separations in Antioch at Somersville Road, A Street and Hillcrest Avenue. The project as defined does not include any other grade separations of roadway crossings east of Hillcrest Avenue. It is assumed that these crossings will be the subject of separate engineering studies as traffic conditions and future roadway development plans indicate a need for these projects based upon the expected future volume of traffic and the number of train operations through each crossing.

Station Parking

All of the alternative transit improvement packages were tested with a total combined allocation of 2,500 parking spaces for all the stations. The patronage modeling showed that this number of spaces could serve the estimated year 2025 demand if high levels of bus feeder service, carpool, and pedestrian/bicycle use were promoted at each station. For planning purposes it is prudent to build about ten percent additional parking to provide a margin for growth. Also, since the Byron Station would be the end of the line, and would likely attract riders from beyond the County line, additional parking was added at this location.

PARKING ALLOCATION BY STATION		
Station	Patronage Based Parking Allocation	Recommended Parking Allocation
Sommersville	700	750
Hillcrest	925	1,000
Empire	450	500
Brentwood	325	450
Byron	100	300
TOTAL	2,500	3,000

The individual cities where the stations are located may elect to provide additional parking beyond these numbers. The goal would be to provide sufficient access including parking, transit and pedestrian/bicycle facilities to serve the projected ridership for each phase of the transit project. One strategy would be for the cities to set aside land for transit oriented purposes

which includes areas for parking with the understanding that over time portions of the land would be sold or leased to developers for Transit Oriented Development (TOD) projects. The parking could be consolidated into a parking structure at this point. This land banking approach is an excellent way to preserve market driven TOD opportunities around the station sites while assuring that there will be sufficient parking.

Local Bus Service Improvements

A key transit need in the East County is the provision of local bus service. Good connections to BART and to the future eBART stations will be vital, as will general improvements in local bus services. The development of eBART will allow Tri Delta Transit to modify its service plan to be less oriented towards the long haul trips to BART at Pittsburg/Bay Point and more oriented towards service within and between the East County cities. A conceptual future service plan has been developed for Tri Delta Transit. The service plan is based on the following concepts:

- eBART Related Service Improvements
 - *Eliminate bus services that duplicate eBART services*
 - *Synchronize headways with eBART schedules*
 - *Create routes oriented more directly to eBART*
- Improved Local Bus Services
 - *Break long routes into shorter routes*

- *Overlay system of short feeder bus routes*
- *Coordinate service provision with development and new roads*

While the development of eBART will allow Tri Delta to eliminate some bus services, based on the input from the public and in particular those who depend on transit for their mobility, it is clear that these operations should be converted into improved local bus services. This will require increased expenditures for transit services. Improvements to the local bus system should occur in the immediate short term and build up over time to the level anticipated when eBART is complete.

Express Bus Service

eBART will not address all the needs of the East County. There is a strong demand for travel from the East County communities to the Tri-Valley area and to the Silicon Valley area. This was verified by the travel surveys performed as part of this study. Improved express bus service to the Tri-Valley area from East County is part of this project. As the implementation of eBART will not likely occur in the very short term the most important short-term transit need is to implement additional express bus services to BART. Tri Delta Transit is currently planning to upgrade its SR-4 express bus service to Pittsburg/Bay Point. The eBART project assumes further express bus improvement in the years leading up to the initiation of eBART service. This would include service to park-and-ride lots at the future eBART stations.

HOV Improvements

High Occupancy Vehicle (HOV) improvements were considered as part of the project. While a number of improvements were considered, only one improvement gained a reasonable level of public support. That improvement involved special treatment for HOVs along Vasco Road at the intersection with Camino Pablo. This

improvement would allow buses and HOVs to bypass traffic queues at this intersection.

Pedestrian/Bicycle Improvements

A conceptual plan for pedestrian and bicycle improvements to better serve each of the stations has been developed. This plan builds upon the recently completed Countywide Bicycle Plan. It gives emphasis to those planned facilities that would provide access to the stations and proposed additional improvements to supplement those already in the bicycle plan.

Transit Oriented Development

A major investment in transit such as eBART creates an important opportunity to enhance transit ridership and the benefits of transit through the use of transit oriented development (TOD) practices around the stations. A special study of TOD opportunities was conducted for each of the five stations sites included as part of the Package C – eBART project. The study indicated that a substantial opportunity for TOD exists at all five sites. If these opportunities were realized, the number of new transit riders that eBART would attract could be increased by 50 to 100 percent by the year 2025.

In order to take advantage of the TOD opportunities the cities can work as is appropriate to each city with the owners of the land nearest the stations to encourage increased densities of development and to

promote a mix of land uses that would support transit. The study of TOD indicated that many of the vacant properties near the stations are already planned for development and that the cities will need to act quickly to have any influence on the nature of the development planned for these sites.

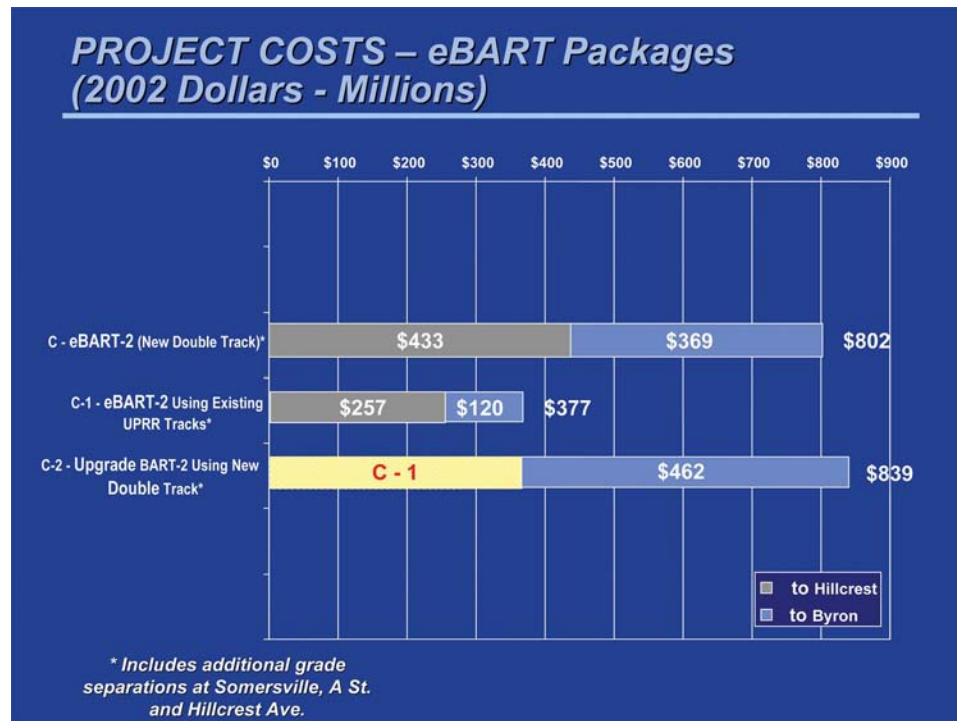
PROJECT COSTS

The total estimated construction cost for the eBART Package C is \$802 million in year 2002 dollars. The cost of extending eBART from Pittsburg/Bay Point to the Hillcrest Station would be \$433 million, and the additional cost to extend all the way to Byron is \$369 million. This includes the costs of the three new grade separations

for the realigned Union Pacific tracks from Loveridge Road to the Hillcrest Station.

If the project is constructed in phases, the first phase, project C-1 has an estimated construction cost of \$377 million in year 2002 dollars. This includes \$257 million for the portion from Pittsburg/Bay Point BART to the Hillcrest Station, and \$120 million for the remaining portion of the project between Hillcrest and Byron. The total estimated cost of Phase C-2 which would complete the construction of the double track eBART from Loveridge Road to Byron would be \$462 million.

The combined cost of phases C-1 and C-2 would be \$839 million. This cost is \$37 million more than the cost of constructing Package C in a single step. Thus, the phased approach of eBART using Packages C-1 and C-2 involves \$37 million in unrecoverable “sunk” project costs.



Chapter 3: Alternatives Considered

The State Route 4 East Corridor Transit Study was planned and designed to provide full consideration of a comprehensive range of alternative transit solutions for the East County. At the onset of the study the PAC developed a long list of transit and transportation improvement types to be considered in the study. Also, previous and ongoing studies had considered BART extensions, eBART options, commuter rail, express bus, and HOV lane alternatives for the area.

INITIAL LONG-LIST OF OPTIONS

The list of options provided by the PAC was reviewed in the light of the previous studies; input received from the public, the TAC, and the special stakeholder interviews. As a result of these efforts the following became the adopted long-list of transportation improvement options that were identified for study:

- Alternative BART Extension Alignments and Station Locations
- Express Bus and Local Bus Options
- Bus Rapid Transit Concepts
- Light Rail Alignments
- eBART or Suburban Light Rail Options
- Private Shuttles, SMART Shuttles, and other shuttle concepts
- Transit Priority Treatments
- Park-and-Ride Facilities
- Intelligent Transportation Systems Projects such as SR 4 (e) Traveler Info and a BART SMART Parking Program
- Traffic Engineering Improvements to the Arterial Street Network
- HOV Lanes
- Travel Demand Management Measures
- Pedestrian Transit Oriented Development Programs and other Land Use Related Programs
- Conventional Commuter Rail and Intercity Rail Programs
- Special Applications of Advanced Transit Technology
- Commuter Rail from East County to a BART Connection at Bailey Road, Pittsburg/Bay Point, North Concord, or Richmond
- Commuter Rail from East County to Downtown Oakland or San Jose
- Pedestrian/Bicycle Access Improvements to Transit Stops/Stations

This list of improvement options was then used by the project team to define an initial set of improvement options. The options which were developed are as follows:

- **BART Extensions**

- **BART-1** – Pittsburg/Bay Point BART Station to Railroad Avenue via the SR-4 median
- **BART-2** – Pittsburg/Bay Point BART Station to Century Boulevard via the SR-4 median
- **BART-3** – Pittsburg/Bay Point BART Station to Hillcrest Avenue via the SR-4 median
- **BART-4** – Pittsburg/Bay Point BART Station to Loveridge Road via the SR-4 median and then to Century Boulevard via the Union Pacific Mococo Line
- **BART-5** – Pittsburg/Bay Point BART Station to Loveridge Road via the SR-4 median and then to Hillcrest Avenue via the Union Pacific Mococo Line

- **eBART Options**

- **eBART-1** – Pittsburg/Bay Point BART Station to the Union Pacific Mococo Line via the median of Bailey Road and then to Byron via the Union Pacific Mococo Line
- **eBART-2** – Pittsburg/Bay Point BART Station to Loveridge Road via the SR-4 median and then to Byron via the Union Pacific Mococo Line

- **Bus Rapid Transit (BRT) Options**

- **BRT-1** – Pittsburg/Bay Point BART Station to the Union Pacific Mococo Line via Bailey Road and then to Byron via the Union Pacific Mococo Line
- **BRT-2** – Pittsburg/Bay Point BART Station to Loveridge Road via the SR-4 median and then to Byron via the Union Pacific Mococo Line

- **Commuter Rail (CR) Options**

- **CR-1** – Peak Period, Peak Direction Service from Stockton to Oakland via the BNSF Railroad Line
- **CR-2** – Peak Period, Peak Direction Service from Tracy to Oakland via the Union Pacific Mococo Line to Port Chicago and then via the BNSF Railroad Line

- **Express Bus (EB) Options**

- **EB-1** – Improved SR-4 express bus service to BART and improved service to Livermore/Pleasanton
- **EB-2** – Improved and expanded express bus services on seven routes including service to Walnut Creek, Concord and the Tri-Valley area as recommended in the Countywide Express Bus Plan
- **EB-3** - An enhanced version of **EB-2** which includes transfer stations and better local connections in the East County

- **High Occupancy Vehicle (HOV) Improvements**

- **HOV-1A** - State Route 242 - State Route 4 HOV Connector: a connector to carry HOVs to and from State Route 242 to the HOV lanes on State Route 4.
- **HOV-1B** - State Route 4 - Reversible HOV lane: a reversible HOV lane on State Route 4 from Century Boulevard to the Hillcrest Interchange. This would involve the use of a moveable barrier system in the median of the freeway.
- **HOV-1C** - State Route 4 Bypass - HOV lanes: The State Route 4 Bypass is being constructed with space reserved in the median for future transit improvement. This option would explore the use of this space as HOV lanes.
- **HOV-1D** - HOV/Bus Priority Treatments on Vasco Road: These improvements would be designed to give buses and HOVs priority treatment at intersections and other bottlenecks on these important routes to the south of the study area.

In addition to these options it was assumed that any selected options would be packaged with other improvements to provide a comprehensive transit improvement plan. These other options included:

- Local Bus Service Improvements
- Shuttle Bus Services - Public/Private
- Intelligent Transportation Systems
- Transportation System Management
- Arterial Street Improvements to Expedite Transit
- Pedestrian/Bicycle Improvements
- Transit Oriented Development Incentives



Bus Rapid Transit (BRT)



Express Bus

SCREENING PROCESS

The transportation improvement options listed above were subjected to a screening or evaluation process that was designed to identify those options which had significant problems, flaws, or other deficiencies. In this manner the list of options could be narrowed by eliminating those that were found to have serious flaws. The screening process took into consideration the following criteria:

- Implementation and Constructability Issues including Upgradeability to BART
- Operational Issues
- Environmental Issues
- Land Use Compatibility
- Ridership Potential
- Costs
- Intermodal Connectivity

A screening evaluation matrix was prepared in which each of the transportation improvement options were evaluated in terms of the above evaluation criteria. The evaluation revealed that a number of options had serious flaws that would warrant their elimination from the evaluation process.

The results of the evaluation were shared with the PAC. In order to directly view the issues and concerns that were revealed in the evaluation, the PAC requested a field tour of the corridor. After this field trip the PAC voted to remove many of the options from further consideration.

SUMMARY OF OPTIONS ELIMINATED AFTER SCREENING PROCESS

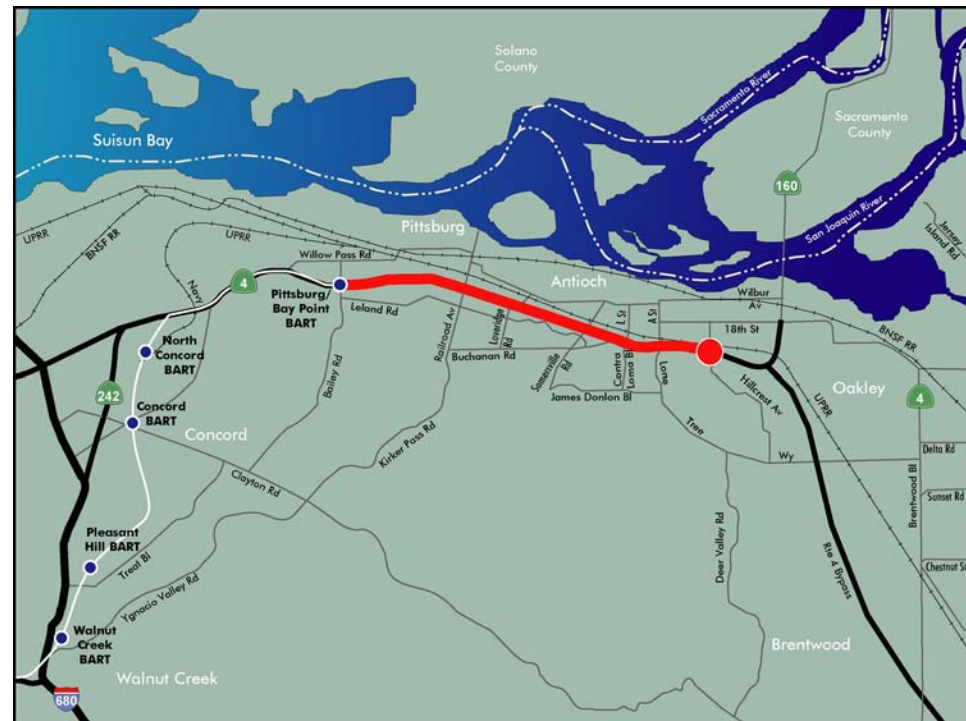
Option	Description	Reasons for Elimination
BART-1	BART to Railroad Avenue via SR-4	Poor location for a terminus station and yard
BART-2	BART to Century Blvd. via SR-4	Poor location for a terminus station and yard
BART-3	BART to Century Blvd. via UPRR	Poor location for a terminus station and yard
eBART-1	BART to UPRR via Bailey Road	Traffic Impact on Bailey Road Interchange Poor connection to BART Large unrecoverable cost
BRT-1	BART to UPRR via Bailey Road	Poor connection to BART Large unrecoverable cost
CR-1/ CR-2	Regional Commuter Rail via BNSF or UPRR	Poor quality of service No direct connection to BART
EB-1/ EB-2	Express Bus Improvements	EB-3 offers better coverage

The results of the screening process were also reviewed with the public during the second round of public meetings.

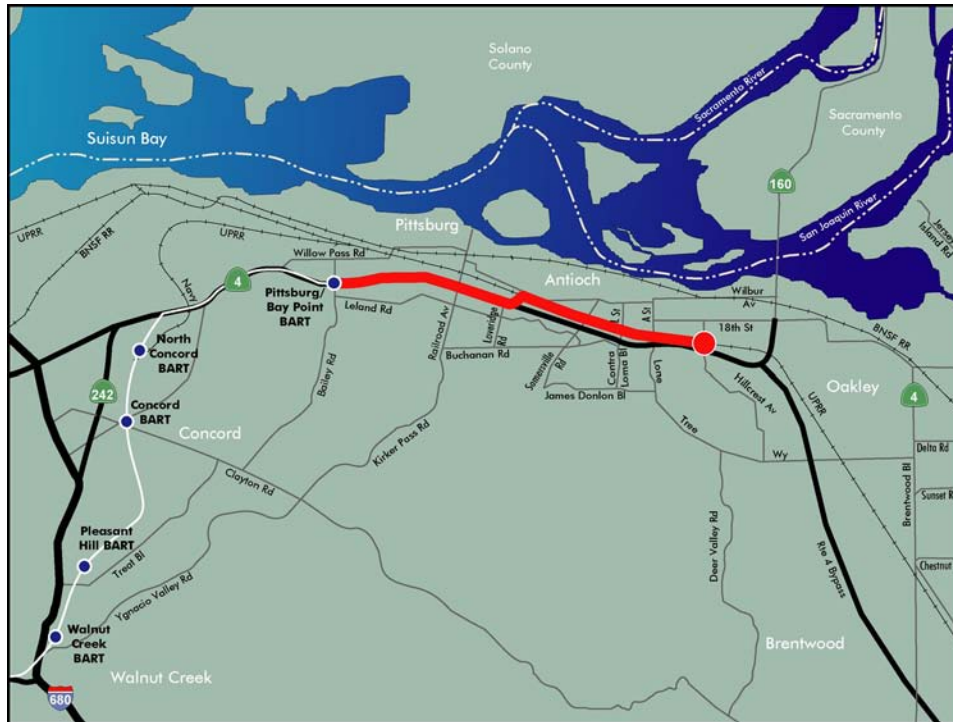
FINAL PACKAGES CONSIDERED

After the screening process the remaining improvement options were subjected to a detailed review and evaluation. First, each option was defined in more detail, located on aerial photographs, and evaluated to determine its engineering requirements. The improvements were also considered in terms of their logical phases of development and defined as implementation packages. The resulting final packages that were developed were:

- **Package A - BART-3:** Pittsburg/Bay Point BART Station to Hillcrest Avenue via the SR-4 median. This option included a terminus station and yard facility at Hillcrest Avenue. Potential in-fill stations could be developed near Century Boulevard and Railroad Avenue. In-fill stations would be developed only if the local jurisdiction and/or private interests come forward with funding.



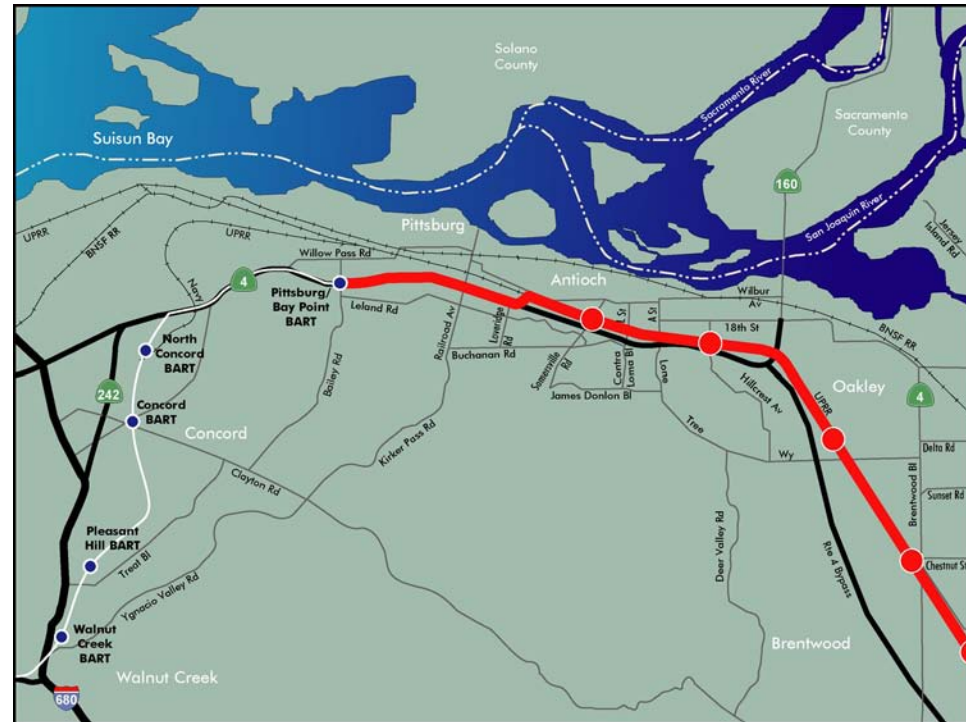
Package A. BART-3: Extension to Hillcrest Avenue via SR4



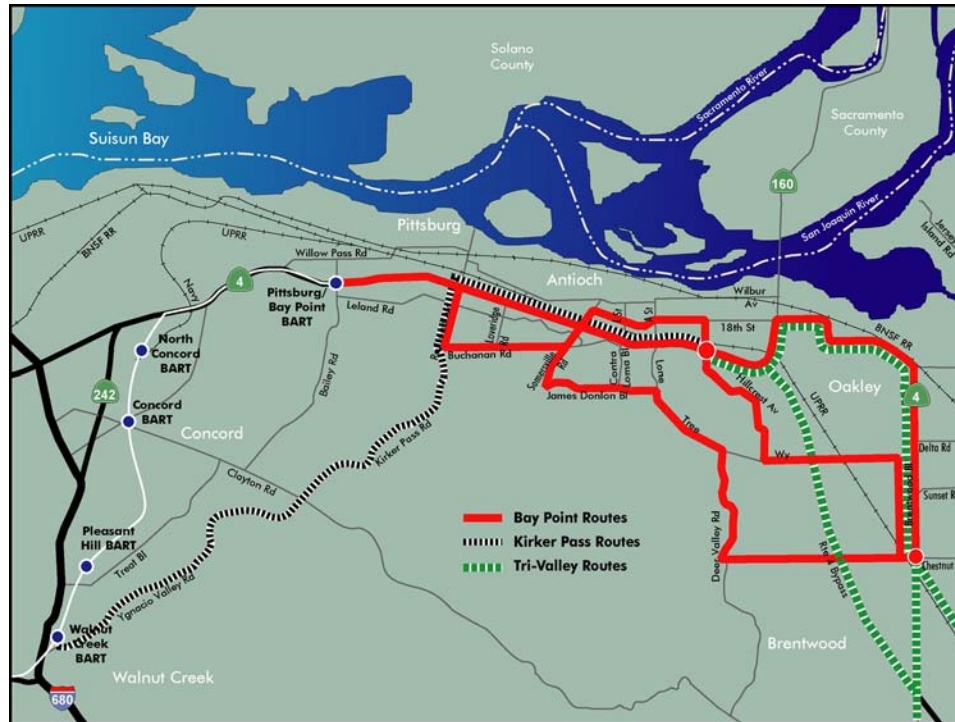
Package B. BART-5: Extension to Hillcrest Avenue via SR4 and UPRR

- **Package B - BART-5:** Pittsburg/Bay Point BART Station to Loveridge Road via the SR-4 median and then to Hillcrest Avenue via the Union Pacific Mococo Line. This option included a terminus station and yard facility at Hillcrest Avenue. Potential in-fill stations could be developed near Century Boulevard and Railroad Avenue.
- **Package C - eBART-2:** Pittsburg/Bay Point BART Station to Loveridge Road via the SR-4 median and then to Byron via the Union Pacific Mococo Line. This option included stations at Somersville Road, Hillcrest Avenue, Empire Avenue, Brentwood, and Byron. A yard and maintenance facility would be located east of Hillcrest Avenue. Two phases of Package C were developed in detail. The first phase, **Package C-1**, would involve the use of the existing Union Pacific Mococo Line tracks between Loveridge Road and Byron. The tracks would be upgraded and passing sidings would be developed to support an interim eBART service. **Package C-2** would be the second phase and would complete the full double track eBART system between Loveridge Road and Byron.

- Package D - BRT-2:** Pittsburg/Bay Point BART Station to Loveridge Road via the SR-4 median and then to Byron via the Union Pacific Mococo Line. This option included stations at Somersville Road, Hillcrest Avenue, Empire Avenue, Brentwood, and Byron. A yard and maintenance facility would be located east of Hillcrest Avenue. A two-lane busway would be constructed in the Union Pacific Mococo Line right-of-way between Loveridge Road and Byron. From Bailey Road to Loveridge Road the buses would use the HOV lanes on SR-4 and surface streets to access the bus transfer center at the Pittsburg/Bay Point BART Station.
- Package E - BRT-2 to eBART-2:** This package has two phases, first to construct BRT-2 to Byron, and then to convert the BRT to eBART as the second phase.
- Package F - BRT-2 to BART-5:** This package would first involve the development of BRT to Byron. The second phase would then involve extending BART to Hillcrest.
- Package G - eBART-2 to BART-5:** This package would first involve the development of eBART to Byron. The second phase would then involve extending BART to Hillcrest Avenue.



Package D. BRT-2: Busway via SR4 and UPRR



Package H: Express Bus

- Package H – Express Bus 3:** Improved and expanded express bus services on seven routes including service to Walnut Creek, Concord and the Tri-Valley area as recommended in the Countywide Express Bus Plan, but also which includes transfer stations and better local connections in the East County.

Chapter 4: Comparison of the Alternatives

The final set of improvement packages or alternatives that emerged from the screening process was subjected to a more comprehensive evaluation process. The process was based on a set of evaluation criteria that were developed to provide a comparison of the ability of the alternatives to satisfy the basic project goals.

EVALUATION PROCESS

The adopted project goals are listed below. For each project goal a set of relevant evaluation criteria were developed. This chapter presents a summary of the findings for some of the key evaluation criteria as noted below. The key criteria are addressed in this chapter for each of the alternative improvement packages.

Adopted Project Goals

- Goal: Improve transportation service – Criteria: Ridership
- Goal: Maximize access to transit systems – Criteria: Ridership and Coverage
- Goal: Maximize economic benefits and financial feasibility – Criteria: Construction Costs, Operating and Maintenance Costs, Revenues, and Funding Potential
- Goal: Maximize connectivity and seamlessness of transit systems, both from home to transit, and from one form of transit to another – Criteria: Connectivity and Seamlessness
- Goal: Promote transit-oriented land use initiatives and policies – Criteria: TOD Ridership Potential
- Goal: Protect or enhance the environment – Criteria: Environmental Impacts
- Goal: Balance short, medium and long term strategies – Criteria: Project Implementation Timing

RIDERSHIP FORECASTS

The best measure of transit service performance is ridership in terms of how many new transit trips will be attracted by the transit improvement. The ridership forecasts for the study were developed using a special process designed to reflect the high levels of growth expected in the East County.

Land Use Projections

The patronage forecasts developed for the State Route 4 East Corridor Transit Study are based on a set of land use assumptions specially developed to reflect the most recent land use plans of the East County cities and communities. The information was developed at the traffic analysis zone (TAZ) scale. There are 437 TAZs in the East County Study area.

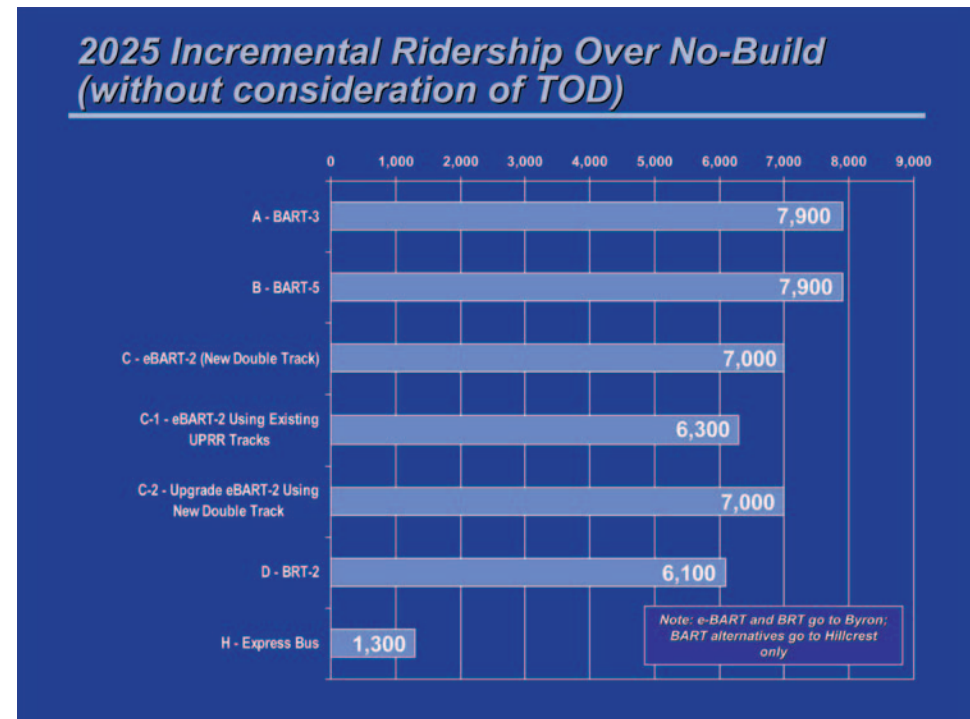
The first step was to develop an accurate depiction of existing land uses in the East County. This was done by using data from the 2000 Census to determine the number of households in each TAZ. The number of jobs was determined by consulting the American Business Information – USA employment estimates.

The year 2025 land use estimates were prepared by starting with the updated Year 2000 existing conditions projections and then working with the County and each of the cities to develop the year 2025 forecasts. All of the cities were in the process of updating their General Plans. This allowed the most current land use data from the general plan processes to be folded into

the land use forecasts. The forecast for the entire East County subregion and the major planning areas were controlled to be consistent with the ABAG Projections 2000 forecasts for 2025. The projections indicate that an additional 40,000 households and about 63,000 jobs would be added to the study area by the year 2025.

Ridership Modeling Results

The CCTA's East County Transportation Model was used as the basis for developing the transit ridership forecasts for the year 2025. First the model was tested to determine its ability to replicate year 2000 conditions. Then the transit component of the model was improved to better represent the future regional transit network including the BART extensions to the San Francisco International Airport and to San Jose. A special transit mode share process was developed for use in the



East County based upon the current levels of usage of the Pittsburg/Bay Point BART Station by East County residents.

The estimated year 2025 daily ridership for the two BART extension options, Packages A and B would be 7,900 persons (station entries/exits). These would be incremental new riders on transit, as compared with those persons who would have used the Pittsburg/Bay Point Station if there was no BART extension or other major transit improvement. The expected incremental new ridership attracted by eBART (the C Packages) would be 7,000 riders per day. eBART ridership would be less than the BART extension because, while eBART attracts more trips from the far East County communities, it would attract less from Antioch than a BART extension to Hillcrest. This is because of the transfer delay associated with eBART to BART and the fact that BART would be faster than eBART between the Pittsburg/Bay Point and Hillcrest Stations. Package C-1, the first phase of eBART, would attract 6,300 new riders in the year 2025. The single track operation required in this option results in longer travel times and slightly less patronage than for the full double-track eBART (Packages C or C-2).

The expected year 2025 ridership for Package D – BRT would be 6,100. This would be less than the expected eBART ridership because the average operating speed for the buses is less than for eBART, and the BRT buses would use the bus transfer center at the Pittsburg/Bay Point BART Station which is a four minute walking distance from the BART platform.

Express Bus system ridership would be 1,300 new riders per day, which is less than any of the other packages. However, the express bus improvements would cost substantially less than the cost of the other alternatives.

CONSTRUCTION COSTS

A key criterion in terms of financial feasibility of the project is the cost to implement and construct the project. A detailed cost estimating methodology was developed for this study. The methodology was designed to provide accurate estimates that would allow equitable comparisons of costs between the alternatives. The methodology employed standard engineering costing techniques. Plan and profile drawings were developed for each alternative. These drawings were then used to determine standard engineering cross-sections for representative elements of each alignment. The cross-sections were then used to develop the construction quantities by type of construction needed to build each portion of the alignment. Unit cost estimates based upon recent construction experience in the Bay Area were then used to build a cost estimate for each alternative. The cost estimates included the following cost categories and are comprehensive in terms of covering all the costs involved with project implementation.

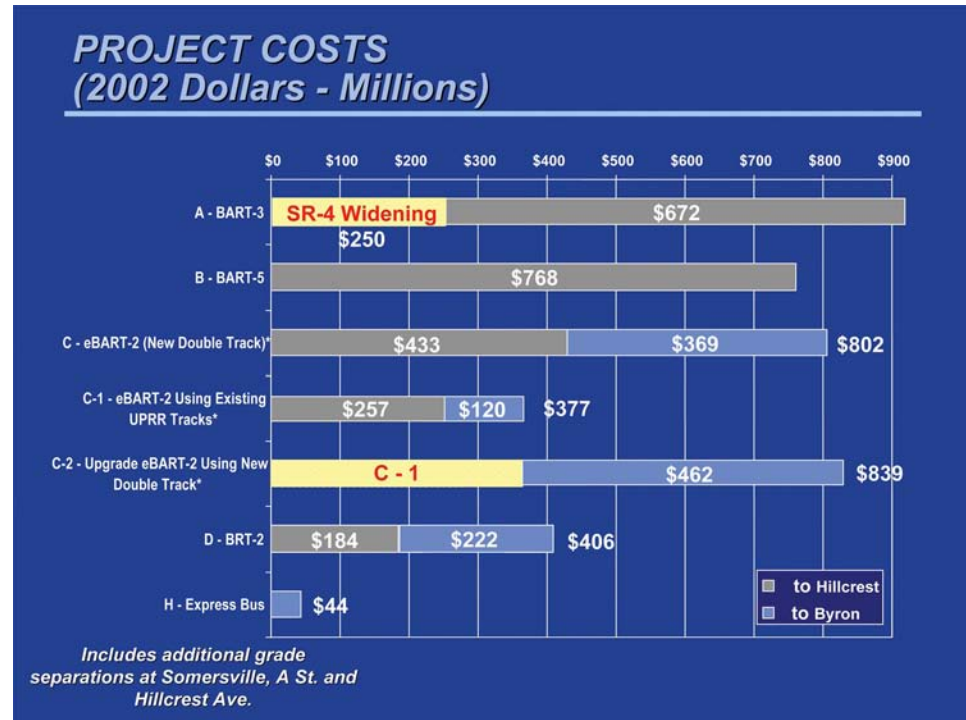
Cost Categories:

- Pre-Project/Environmental Studies – Includes planning, environmental, and preliminary engineering.
- Construction – Includes construction of the transit guideway, stations, yards and other support facilities, and related construction items such as utilities relocation, reconstruction of existing facilities, demolition and site clearance.
- Vehicles – Includes all costs related to vehicle procurement.

- Right-of-Way – Includes the acquisition of the right-of-way for the transit guideway, as well as right-of-way for stations, yard and other support facilities.
- Project Implementation – Includes professional services and related expenses during project design, construction, and service initiation.
- Unallocated Project Reserves – A reserve fund set aside to address unexpected project costs. This fund is required for all projects using federal funds.
- Other Infrastructure to Accommodate Transit – Includes modifications to transportation facilities or other infrastructure required to allow the transit facilities to be constructed.

Summary of Cost Estimates

The total cost estimates for the alternative packages are in year 2002 dollars. The cost of **Package A – BART to Hillcrest via SR-4** is \$672 million. However, before this project can be completed the widening of SR-4 to Hillcrest Avenue must be completed. This widening would cost an additional \$250 million, bringing the total project cost to \$922 million. In comparison, the cost of **Package B – BART to Hillcrest via SR-4 and the UPRR** would be a total of \$768 million. This project does not require the completion of the SR-4 widening to Hillcrest Avenue as it uses the Union Pacific Railroad's Mococo Line right-of-way to reach Hillcrest Avenue.



Package C – eBART-2 to Byron – The total cost of this package which would extend all the way to Byron, would be \$802 million. The portion of the project to Hillcrest Avenue could be constructed for \$378 million. The new grade separations at Somersville Road, A Street and Hillcrest Avenue, add \$55 million to the cost, bringing the total cost to Hillcrest to \$433 million. If eBART is to be implemented in phases, the first phase would likely be **Package C-1 - eBART-2 to Byron via the existing UPRR tracks**. This initial phase of the project would cost \$346 million to extend to Byron. With the inclusion of the new grade separations at Somersville Road, A Street and Hillcrest Avenue, \$31 million would be added to the cost, bringing the total cost to \$377 million. The second phase of the project would be **Package C-2 – eBART to Byron with full double tracking**. This package

would cost \$462 million in addition to the cost of Package C-1 for a total of \$839 million. With the new grade separations at Somersville Road, A Street and Hillcrest Avenue which are included as part of Package C-1, there would also be a cost increase in Package C-2 of \$24 million for the new double track eBART grade separation structures at these locations. This phased approach of implementing Package C-1 and then Package C-2 results in \$37 million of unrecoverable sunk costs in Package C-1 that cannot be used for Package C-2.

The estimated cost of **Package D – BRT to Byron** would be \$406 million. The portion of the project extending to Hillcrest Avenue would cost \$184 million. This package is less expensive than the full eBART (Package C, or Package C-1 and C-2 combined). However, Package C-1, at \$377 million, is less than the cost of Package D, because the use of the existing railroad tracks is more cost-effective than building the bus roadway in the railroad right-of-way.

The least expensive package would be **Package H – Express Bus**. Purchase of the buses to operate the new express bus services in this package would cost \$44 million.

OPERATING AND MAINTENANCE COSTS

Costs for operations and maintenance (O&M) are important elements to consider in making decisions regarding future transit services. Although costs for O&M are generally small in comparison to capital costs associated with infrastructure development and purchase of rolling stock, O&M costs are recurring and in some cases help justify larger capital costs.

Operating plans which determined the number of vehicles and vehicles hours of operation to provide the transit services were

defined for each alternative. The services were planned to mirror the service frequencies and hours of service provided by BART. BART headways (the time between trains) are planned to be twelve minutes in the year 2025. The cost per vehicle-hour for each type of service was based on the experience of other West Coast operators.

The O&M costs for the two BART extension options, Packages A and B, would be \$20 million per year in 2002 dollars. The costs for the eBART packages (C, C-1, C-2) would all be similar, \$21 million per year. eBART is more expensive than BART because the eBART system is 22 miles long versus 9.4 miles for the BART extension. BRT, Package D, would be less than the rail packages, at \$11 million per year. The least costly package would be the express bus option, Package H, at a cost of \$9 million per year.

REVENUES

Based upon the ridership forecasts for each alternative, estimates of future revenues were developed. A fare structure based upon BART's current fare policy was assumed. In addition to fare revenues, revenues from station parking were also assumed, based upon BART's recent policy that 25 percent of the station parking could be reserved for paid parking.

The revenues for the BART and eBART packages would be similar, all in the range of \$12 million per year in

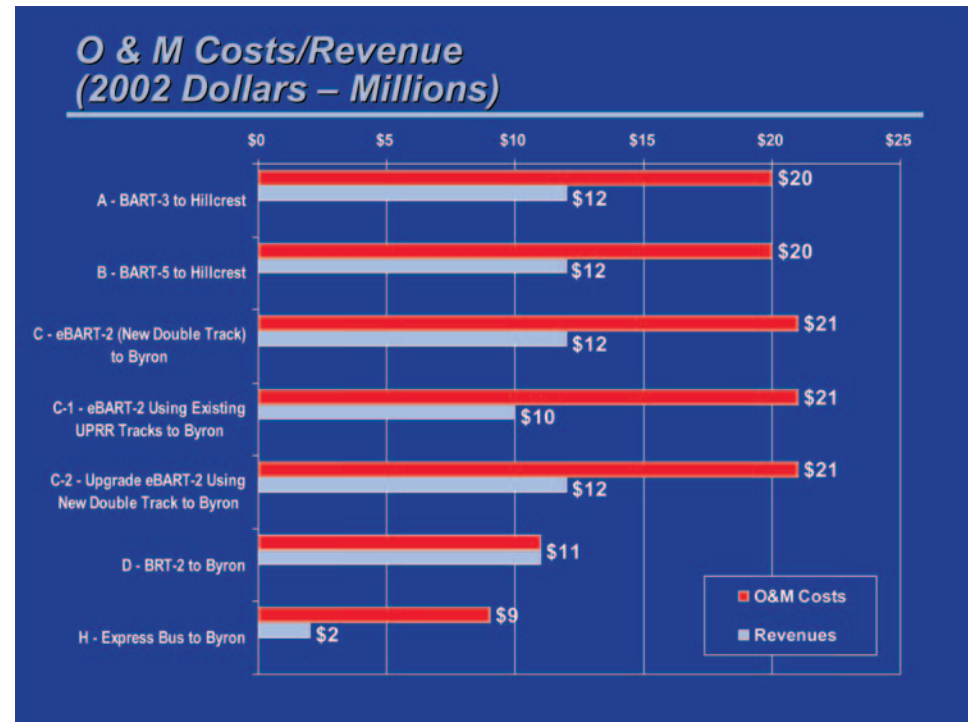
2002 dollars. The revenue for eBART Package C-1 would be \$11 million per year due to the slightly lower patronage associated with this option. The rail options would be able to cover from 50 to 60 percent of their O&M costs from revenues. This is a characteristic of most rail transit operations. BART recovers about 60 - 70 percent of its O&M costs from revenues. BRT would nearly cover all of its \$11 million in annual O&M costs from revenues, and the express bus package would cover 22 percent of its costs.

The successful inclusion of TOD in the project could increase ridership significantly, which would increase revenues and reduce the need to subsidize operations.

COVERAGE/CONNECTIVITY/ SEAMLESSNESS

One goal of the project is to provide a seamless connection to BART, and to maximize the connectivity of transit serving East County. In terms of a seamless connection to BART, a BART extension would be the best, because there would be no transfer or connection.

eBART would provide a very good, if not seamless, transfer to BART depending on the exact nature of the connection. At the worst, the transfer would require a walk from one platform to another of



100 to 450 feet. An across-the-platform transfer may be feasible, which would shorten the walking distance to about 30 feet. If the technology called “bobBART” (see Chapter 2), which involves the operations of actual BART cars on eBART tracks, were adopted the connection would be truly seamless. The choice of vehicle technology and the final configuration of the transfer station are complex issues which will require further investigation. eBART would allow for a future upgrading to BART.

BRT and express bus service would provide the least effective connection to BART, as they both would use the existing bus transfer center at the

Pittsburg/Bay Point station which requires a relatively long walk to the BART trains.

In terms of connectivity the eBART, BRT, and Express Bus options have numerous stops in East County and would accordingly provide better access and opportunities for connections to local transit service than would BART.

TRANSIT ORIENTED DEVELOPMENT (TOD)

A BART, eBART, or BRT station creates a node of accessibility which offers attractive real estate benefits to those who own property around the station. BART's experience is that a high percentage of those who live and work near BART, use BART for transportation. The concept of TOD is to concentrate development around transit stations, and to design new development with features that facilitate walking and encourage people to leave their cars at home or to forego a car altogether.

An assessment of the potential for TOD was conducted as part of this study at each of the proposed station sites. Because eBART and BRT offer five station sites in the East County, the TOD potential afforded by these options is greater than BART, which would only have one new station. This assessment suggests that eBART ridership could be increased by as much as 50 to 100 percent if aggressive TOD programs were promoted by the cities at each of the five stations sites. This would increase eBART ridership in the year 2025 to 10,500 to 14,000 daily riders.

ENVIRONMENTAL

While this study did not include any detailed environmental

review of the alternatives, an environmental reconnaissance was conducted to assess whether any of the options posed serious environmental consequences. The reconnaissance concluded that "None of the issues in this study appear to preclude construction of any of the alternatives under consideration."

Noise

In the planning and the costing of the alternatives it was recognized that those options using the Union Pacific Mococo Line right-of-way would pose potential new noise and visual impacts on the residences adjacent to the railroad. Recognizing this, the cost estimates for the BART, eBART and BRT packages include costs for the provision of sound walls.

Hazardous Materials

The construction of a transit improvement in the Union Pacific Mococo Line right-of-way may involve issues related to hazardous materials. These materials may have been deposited over time due to railroad operations or the oil pipelines which exist in the right-of-way. Detailed investigation of this issue would be required before the right-of-way is purchased.

Wetlands

There are several potential seasonal wetlands and freshwater marsh areas within the project area and the alignments cross creeks, drainage ditches, and canals. Should the project impact or displace any wetland area, mitigation would be required.

Historic/Cultural Resources

The proposed project has a high potential to encounter historic archaeological resources and will almost certainly require the recordation and evaluation of historic built environment features.

Transportation/Air Quality

The project will by its nature reduce automobile travel and have a positive impact on traffic congestion and air quality. All transit vehicles proposed to be used in the alternatives would meet all federal and state air quality standards. There may be some traffic and parking related impacts around stations that will require mitigation.

IMPLEMENTATION TIMING

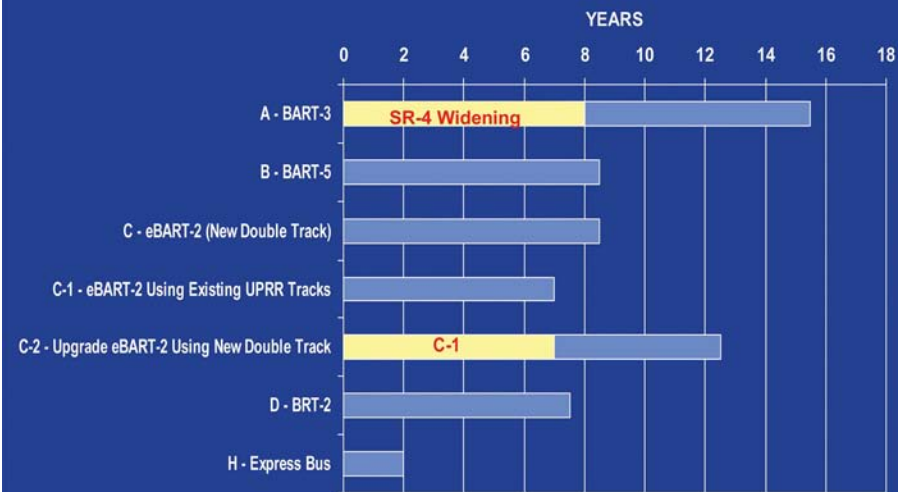
The amount of time required to plan, design, and construct each alternative package was estimated. The timeline includes environmental clearance, purchase of the right-of-way, engineering design, vehicle acquisition, construction, and system testing prior to operations. The timelines assume that ample funding is available for the project. For each project an optimistic and a conservative schedule was developed, representing a range in which the actual schedule is likely to fall.

Package A – BART to Hillcrest via SR-4 will require 7.5 years to complete. However, before this project can be completed the widening of SR-4 to Hillcrest

Avenue must be completed. This widening would require an additional 8.0 years. Package B – BART to Hillcrest via SR-4 and the UPRR would require 8.5 years, but this project does not require the completion of the SR-4 widening to Hillcrest Avenue as it uses the Union Pacific Railroad's Mococo Line right-of-way to reach Hillcrest Avenue. Package B could be completed much faster than Package A.

Package C – eBART-2 to Byron – This package which would extend all the way to Byron, would require 8.5 years to complete. If eBART is to be implemented in phases, the first phase would likely be Package C-1 - eBART-2 to Byron via the existing UPRR tracks. This initial phase of the project could be completed in 7 years. The second phase of the project would be Package C-2 – eBART to Byron with full double tracking. This

Time Until Service Initiation (without consideration of funding)



package would require an additional 5.5 years to complete over the time required to complete Package C-1.

The estimated duration for implementation of Package D – BRT to Byron would be 7.5 years, similar to the eBART packages. Package H – Express Bus could be implemented in the least time, about 2.0 years.

FUNDING

Capital funding for the corridor project would be provided through a variety of sources. The Metropolitan Transportation Commission's Regional Transit Expansion Policy (RTEP), Resolution 3434, identifies the estimated project cost to be \$345 million and includes a total of \$246 million for the project from State Transportation Improvement Program (STIP) funds, bridge toll funds, and local sales tax funds. Using the RTEP as a foundation, additional potential sources of funds were identified to close the funding shortfall and to augment the RTEP in the event that the cost of the selected alternative was higher than that estimated in the RTEP.

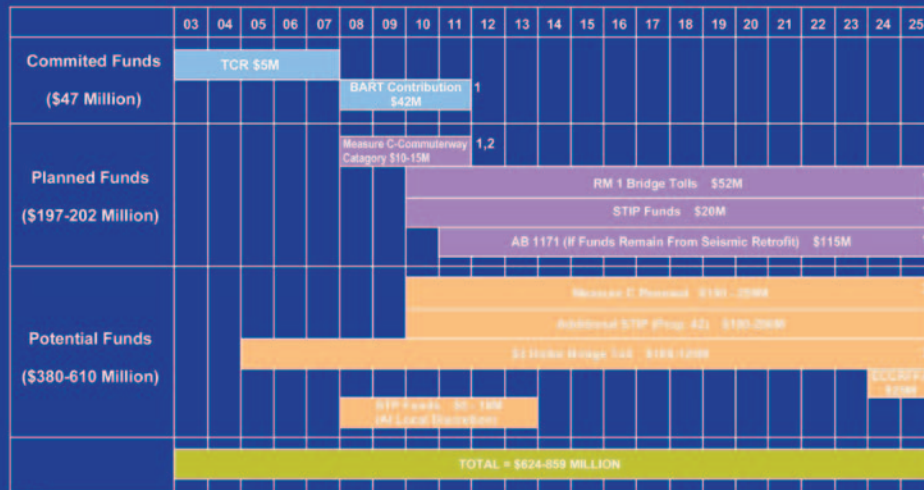
Several of the revenue sources considered for the project are uncertain at this time because they require voter approval and/or approval by the state legislature. To provide a realistic funding plan based on revenues that can reasonably be expected to be available to the project, the following sources and amounts (in escalated dollars) were included:

Based on the funding availability, the preliminary financial feasibility analysis indicates that Package C-1 eBART-2 Using Existing UPRR Tracks, Package D – BRT, or Package H – Express Bus could be funded.

For Package C-1 annual funding availability was matched to funding needs (project costs escalated to year of expenditure dollars) to determine when shortfalls would occur and if financing techniques could address the shortfall needs.

PROJECT FUNDING	
Source	Amount (\$ millions, escalated)
Traffic Congestion Relief Program	\$5
Measure C/BART Contribution	\$52
Regional Measure 1 Bridge Tolls	\$68
STIP	\$95
AB 1171 Bridge Tolls/ Other ¹	\$155
TOTAL	\$375
Note 1: If AB 1171 funds are not available, other sources such as Measure C sales tax renewal or increased bridge toll funds will be needed.	

Potential Project Funding by Fiscal Year (in 2002 \$)



NOTES:

1 - Included in the Regional Transit Expansion Policy, MTC Resolution No. 3434

2 - Potential Eligibility Issues

3 - Requires Voter Approval

Although the total funds available match the amount needed, significant funding shortfalls occur during the key construction years of the project (FY 2006 – FY 2009) even when revenues are assumed to be available as early as possible. A loan or series of loans totaling \$175 - \$200 million over five years would be needed to bridge this gap. The funding gap will continue to grow if revenues are deferred beyond the available periods assumed. Financing the shortfall would be simplified if Measure C is renewed. New Measure C revenues would provide the debt capacity needed to finance the shortfall. The cost of bridge financing (fees and interest expense) may need to be added to the cost of the project when a financing mechanism is identified.

The implementation of any of the other packages, Packages A and B – BART, and Packages C or C-2 would require additional funding such as the Measure C renewal and the \$3 Bay Bridge toll.

Chapter 5: Project Implementation

A plan has been developed to help guide the implementation of Package C – eBART-2 to Byron. The plan assumes that due to funding constraints the project will be implemented in phases. Packages C-1 and C-2 represent a logical and cost effective approach to phasing the project.

PHASING/IMPLEMENTATION PLAN

A phasing and implementation schedule has been developed for Packages C-1, C-2, and C. The key implementation steps are discussed below.

PACKAGE C1 - EBART TO BYRON (EBART-2)																						
PHASES		DURATION IN MONTHS																				
		6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108			
C1-1	Conduct Environmental/Preliminary Engineering Studies	EIR, EIS, NEPA, CEQA (24 mo.)																				
C1-2	Prepare PS&E and Award Project					Design and Award Project in Phases (24 mo.)						Systems Design (12 mo.)										
C1-3	Purchase UP Right-of-Way plus Trackage Rights/ Secure Station/Yard Right-of-Way					ROW Purchase (18 mo.)																
C1-4A	Complete Loveridge Interchange Project	*																				
C1-4	Construct New track on SR4 and Loveridge Aerial Structure & Relocate Tracks to Hillcrest					Loveridge Aerial (12 mo.)		Construction at grade to Hillcrest & Byron(24 mo.)														
						Relocate UPRR Track to Hillcrest incl. Bridges (30 mo.)																
												Trackwork to Loveridge (12 mo.)		Trackwork to Hillcrest (12 mo.)								
												System, Testing & Pre Revenue Testing (24 mo.)										
C1-5	Upgrade existing track to 59 mph between Hillcrest and Byron									Upgrade Track from Hillcrest to Byron (36 mo.)												
C1-6	Procure and Test Vehicles					Spec, Bid, Procure & Test Vehicles (60 mo.)																

Conduct Environmental/Preliminary Engineering Studies

There is a choice of preparing an Environmental Impact Report (EIR) which satisfies the California Environmental Quality Act (CEQA) or an Environmental Impact Study (EIS) which satisfies the National Environmental Protection Act (NEPA), or a combined EIR/EIS document. Typically in California if an EIS is prepared, it would be prepared as a combined EIR/EIS. An EIS must be prepared if the project is to compete for federal funding. Also to qualify for federal funds the project must receive environmental clearance before right-of-way can be purchased. The main difference between an EIS and an EIR is that an EIS requires that all alternatives receive equal treatment. This will require that much of the alternatives screening and evaluation that has been done to date, would need to be repeated. A 24 month duration is estimated for an EIR or a combined EIR/EIS. An EIR can generally be completed more quickly than an EIS, but the time difference is not substantial. Two to four years is fairly common for transit project EIR/EISs. The environmental document should consider all three Packages C-1, C-2, and C in order to clear the entire project at one time.

Further planning studies and preliminary engineering will need to be done to support the environmental work. Specific technical study efforts which need to be done include:

- eBART/BART Transfer – Further studies are necessary to develop the optimal transfer configuration between eBART and BART. This will require resolution of operational, engineering, vehicle technology, and institutional issues which affect the transfer.
- Vehicle Selection – The specific type of vehicle to be used for the eBART trains needs to be selected. The decision as to whether the vehicle needs to be FRA compliant must be made. Also the feasibility of the “bobBART” concept needs to be investigated. The specific vehicle type influences the nature of the eBART/BART transfer configuration and possibly the gauge of the tracks to be constructed.
- Station Area Planning – If TOD is to occur at the five station sites, an aggressive planning effort must take place immediately. This would ideally take the form of a specific plan effort conducted by the jurisdictions which control the land around the stations. In addition the station area planning needs to address how the appropriate land can be set aside for station parking.

Purchase UP Right-of-Way/ Secure Station/Yard Right-of-Way

The efforts required to purchase the right-of-way need to be initiated immediately so that the actual transfer of the right-of-way can occur after the environmental studies are complete. There are a number of issues related to the right-of-way purchase as follows:

- Ideally the UP could be convinced to waive the need for trackage rights. This may not be feasible or may add considerably to the acquisition cost. The answers to these questions cannot be determined until actual acquisition negotiations are undertaken.
- If the UP would not waive trackage rights, the next best approach would be to get agreement on a temporal separation of freight and passenger traffic. This would involve relegating any freight activity to the very late evening and early morning hours. A temporal separation is required if non-FRA compliant DMUs are to be operated. (As the eBART concept is to meet every BART train, UP would be running its freight traffic from 2:00 a.m. to 3:30 a.m.)
- If the UP does not agree to either waive trackage rights or a temporal separation, then the eBART system must be planned and designed to operate as if freight trains would be sharing the tracks with the passenger trains. This definitely requires the use of FRA compliant DMUs. There is no manufacturer that currently produces such a vehicle, although one manufacturer has an operating prototype and a second has developed a conceptual design. The current freight train usage of these tracks is very infrequent. However, there is always the risk that future circumstances may change this situation. For example, weather or earthquake damage to the Altamont Pass route could force trains onto the Mococo Line.

Thus, there is a risk that Package C-1 may prove to be infeasible if the UP does not agree to waive or temporally reduce its trackage rights and an FRA compliant vehicle is not available for purchase. It seems, however, very likely that an FRA compliant vehicle would be available in the time-frame required for implementation which allows 6 to 8 years before the acquisition of the vehicles needs to occur.

Because Package C uses new double tracks totally exclusive of the UP freight tracks, it has none of the above implementation issues. It only requires that the UP agree to sell half of the 100 foot wide right-of-way, which they have indicated is acceptable to them. The UP would then be free to use their relocated freight tracks for their operations and would not in any way interfere with eBART operations.

Before the right-of-way can be purchased there will need to be investigations including:

- The location and identification of all utilities in and crossing the right-of-way and the legal status of all utility easements and leases.
- The determination of the location and extent of any hazardous materials in the right-of-way and the actions which would be required to mitigate their presence.

In addition the right-of-way for the station sites and the yard facilities needs to be identified and efforts made with the cooperation of the local jurisdictions and property owners to preserve the required lands.

Design and Construction Phases

The preparation of the design plan for the project can occur with the completion of the environmental documents. However, it will be important to determine early during the environmental phase which type of design and construction process will be used. The schedule that has been developed is for a conventional process where the design is independent of the construction. The design contract would be awarded and when the design is complete the construction contract would be awarded. The option to this would be a design-build process. In this process the design and construction contracts would be awarded together. This process allows the designers and the construction contractors to work as an integrated team. Construction can start before the design is complete, which can provide significant time savings.

FUNDING PLAN

The capital cost of the project was escalated to the year of expenditure dollars for each cost category. The total amount of the cost category was escalated to the first year of expenditure for that category. Similarly, certain revenue categories were escalated to the year they were expected to be available.

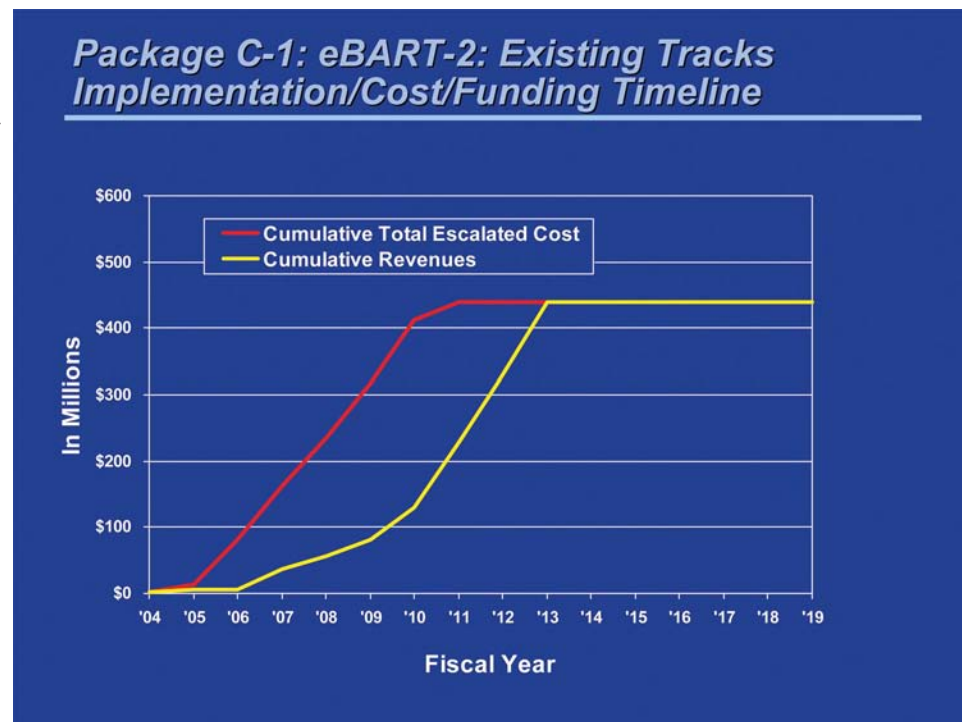
The escalated revenues under each scenario were compared to the escalated project costs for each alternative. This preliminary analysis indicated that only Package C-1, e-BART-2 using the existing UPRR Tracks, could be funded under the conservative revenue scenario.

Financial Analysis for Package C-1

Based on the results of the preliminary funding feasibility described above, a more detailed financial plan was developed for Package C-1. Costs were spread over the time that they would be spent and then escalated to year of expenditure dollars to estimate the cash flow needs of the project. Annual funding availability was matched to funding needs to determine when shortfalls would occur and if financing techniques could address the shortfall needs.

The results of the financial analysis suggest the following:

1. To keep the desired project schedule, significant funding shortfalls occur during the key construction years of the project (FY 2006 – FY 2009) even when revenues are assumed to be available as early as possible. A loan or series of loans totaling \$175 - \$200 million over five years would be needed to bridge this gap. The funding gap will continue to grow if revenues are deferred beyond these relatively optimistic assumptions.
2. Due to the nature of the funding sources in the plan (e.g., grants based on bond proceeds from toll revenues), debt financing in the private market



would be limited. A short term financing of approximately \$175 million over five years might be possible through the State Infrastructure Bank. Other bridge financing options might include loans or funding swaps within the region or potentially within the state. However, the amount of funding needed over a relatively short period of time would make such loans or swaps difficult.

3. Financing the shortfall would become much more feasible if Measure C is renewed. Even if Measure C revenues were not dedicated to the project, the available debt capacity would enable the shortfall to be financed with Measure C renewal funds and repaid with the project revenue sources when they are allocated at a later date.
4. The cost of bridge financing (fees and interest expense) will need to be added to the cost of the project if that option is pursued.
5. If no financing mechanism were available to meet the cash flow shortfalls under the desired project schedule, deferral of the project would allow for full funding without other means of financing. A deferral of three years results in full funding of the project on a pay as you go basis, assuming revenues are available relatively early in the project schedule.

RECOMMENDED NEXT STEPS

In order to move forward with plans to implement eBART, the following initial steps are recommended:

- Proceed with further planning/design and environmental studies. It is recommended that an EIR/EIS be prepared to allow the project to qualify for any available federal funding.
- Continue efforts to secure the UP right-of-way.
- Initiate station area planning efforts to encourage TOD and adequate parking in each City.
- Further investigate transfer station options and vehicle technologies.
- Work to make sure this project is included in the upcoming Measure C renewal package, the \$3 Bay Bridge Toll package, and other potential funding programs.